

M.B.A. DEGREE (FT) II SEMESTER EXAMINATION, MAY 2007

SMS 2202 MANAGEMENT SCIENCE

Time: 3 Hours

Maximum marks : 50

(Answer **ALL** questions)
(All questions carry **EQUAL** marks)

- I. A. (a) Discuss the steps in decision theory. (4)
(b) The following matrix gives the pay off of different strategies S_1, S_2, S_3 against different conditions N_1, N_2, N_3 and N_4 .

	N_1	N_2	N_3	N_4
S_1	4000	-100	6000	18000
S_2	20000	5000	400	0
S_3	20000	15000	-2000	1000

Indicate the decision taken under approaches pessimistic, optimistic, regret and equal probability. (6)

OR

- B. (a) Explain the rules of game theory.
(b) Solve the following game by using the principle of dominance:

		Player B					
		I	II	III	IV	V	VI
Player A	1	4	2	0	2	1	1
	2	4	3	1	3	2	2
	3	4	3	7	-5	1	2
	4	4	3	4	-1	2	2
	5	4	3	3	-2	2	2

- II. A. Maximise $Z = 3x_1 - x_2$
Subject to
 $2x_1 + x_2 \geq 2$
 $x_1 + 3x_2 \leq 3$
 $x_2 \leq 4$
and $x_1, x_2 \geq 0$

OR

- B. Maximise $Z = 12x_1 + 15x_2 + 14x_3$
Subject to
 $-x_1 + x_2 \leq 0$
 $-x_2 + 2x_3 \leq 0$
 $x_1 + x_2 + x_3 \leq 100$
and $x_1, x_2, x_3 \geq 0$

- III. A. (a) Explain least cost method of solving transportation problem. (4)
(b) Find the initial basic feasible solution to the following transportation problem using VAM and do test for optimality:

		To			
		A	B	C	
From	L	2	7	4	5
	M	3	3	3	8
	N	5	4	7	7
	O	1	6	2	14
		7	9	18	

(6)

(Turn over)

OR

- B. (a) Explain assignment model and the steps. (4)
- (b) A department has four subordinates and four tasks to be performed. The subordinates differ in efficiency and tasks differ in their intrinsic difficulty. The estimates of the profit in rupees each man would earn is given in the effectiveness matrix. How should the tasks be allocated, one to each man, so as to maximize the total earnings ?

		Task			
		I	II	III	IV
Subordinates	1	5	40	20	5
	2	25	35	30	25
	3	15	25	20	10
	4	15	5	30	15

(6)

- IV. A. (a) Explain the characteristics of queueing model. (4)
- (b) A self service store employs one cashier at its counter. Nine customers arrive on an average every 5 minutes while the cashier can serve ten customers in 5 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service rate, find
- (i) Average number of customers in the system.
 - (ii) Average time a customer spends in the system.
 - (iii) Average time a customer spends in the queue.

(6)

OR

- B. (a) State the assumptions of sequencing problems. (4)
- (b) There are five jobs which are to be processed through three machines A, B and C in the same order. Processing time in hours are given. Determine the optimum sequence for the five jobs at the minimum elapsed time.

Job	A	B	C
1	3	4	7
2	8	5	9
3	7	1	5
4	5	2	6
5	4	3	10

- V. A. (a) Where do you apply simulation model in business and state the limitations as well. (4)
- (b) Write the steps involved in solving simulation problems. (6)

OR

- B. Table below shows jobs, normal and crash time and cost for a project. Indirect cost for the project is Rs.300 per day. Find the optimum duration and project cost.

Job	Normal		Crash	
	Time (days)	Cost (Rs.)	Time (days)	Cost (Rs.)
1-2	6	1400	4	1900
1-3	8	2000	5	2800
2-3	4	1100	2	1500
2-4	3	800	2	1400
3-4	Summary	-	-	-
2-5	6	900	3	1600
4-6	10	2500	6	3500
5-6	3	500	2	800
